

## REMARKS

Claims 1-36 as originally filed in the parent application have been cancelled without prejudice. After entry of the amendment, new claims 37-48 are pending in the application.

New independent claims 37, 41 and 45 explicitly recite a “water-conducting membrane having at least two opposed surfaces and comprising an at least partially sulfonated random hydrocarbon copolymer.” Support for claims 37, 41 and 45 is found throughout the Specification and Drawings, and at least at paragraphs 0003 through 0043. The application states, at paragraph 0042, that “the backbone could be a block or random polymer.” The features of an air conditioner, and a method of conditioning air for an enclosure by transferring heat and moisture between a first stream of outside ambient air and a second stream of enclosure return air using a membrane to separate the two streams, are fully disclosed in the application. The application teaches air conditioning “within a certain space” (e.g., air conditioning an enclosure) at least at paragraphs 0003 through 0012, and generally throughout the disclosure. The application teaches HVAC using a fresh air stream and a re-circulating air stream at least at paragraph 0003.

New dependent claims 38, 42 and 46 depend from independent claims 37, 41 and 45 respectively, and recite “at least partially sulfonated random hydrocarbon copolymer comprises at least one arylvinyl monomer.” New dependent claims 40, 44 and 48 depend from independent claims 37, 41 and 45 respectively, and recite “at least partially sulfonated random hydrocarbon copolymer comprises at least one olefin monomer.” Support for claims 38, 40, 42, 44, 46 and 48 may be found throughout the Specification and Drawings, and in particular at paragraph 0041. In paragraph 0041, the specification describes a commercially available sulfonated polymer membrane having a hydrocarbon backbone chemical structure that is distributed by Dais Corporation of Odessa, FL under the product name DAIS 585. An article published in Design News on June 22, 1998, entitled “New membranes boost PEM performance,” a copy of which is attached hereto as Exhibit B (2 pages), was obtained by downloading from the web site [www.manufacturing.net/dn/index.asp?layout=articleWebzine&articleid=CA118013](http://www.manufacturing.net/dn/index.asp?layout=articleWebzine&articleid=CA118013). The article

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discusses Proton Exchange Membranes (PEM) for fuel cell applications, and does not teach or suggest their use in air conditioning applications. The article describes the Dais 585 material as a “sulfonated styrene/ethylene-butylene/styrene tri-block copolymer” that exhibits the desirable properties of high conductivity (“one of a membrane material's most important properties is high protonic conductivity”) and low cost in the fuel cell context. The description “DAIS 585” in the application therefore refers to at least a “sulfonated styrene/ethylene-butylene/styrene tri-block copolymer” as evidenced by the disclosure of the June 22, 1998 article. As will be explained in more detail below, styrene is an arylvinyl monomer, and ethylene and butylene are each olefin monomers as those terms are used in the ‘298 patent.

New dependent claims 39, 43 and 47 depend from claims 38, 42 and 46 respectively, and recite “said at least one arylvinyl monomer is at least partially sulfonated.” Support for claims 39, 43 and 47 may be found throughout the Specification and Drawings, and at least at paragraphs 0003 through 0043. In particular, the Dais 585 material is known to be sulfonated at the styrene (e.g., arylvinyl) component. Applicants submit that the amendments do not introduce new matter.

#### **SUPPORT FOR INTERFERENCE UNDER 37 C.F.R. §1.607(a)(1)-(a)(6)**

37 C.F.R. §1.607(a)(1): Applicants request that an Interference between the present application and U.S. Patent No. 6,413,298, issued July 2, 2002 to Wnek et al. be declared. The ‘298 patent issued from an application which was filed on July 28, 2000 as U.S. application Serial No. 09/627,776 (hereinafter “the ‘776 application”), and which did not claim priority to any other application. The filing date of the ‘776 application is later than the effective filing date of the present application.

37 C.F.R. §1.607(a)(2): Applicants present the following three (3) proposed Counts.

Count 1. A method of conditioning air for an enclosure by transferring heat and moisture between a first stream of outside ambient air and a second stream of enclosure return air comprising:

disposing a water-conducting membrane between said first and second stream, said water-conducting membrane having at least two opposed surfaces and comprising a sulfonated statistical copolymer, said statistical copolymer comprising at least one arylvinyl monomer and at least one olefin monomer, and wherein aromatic moieties derived from the arylvinyl monomer are at least partially sulfonated; and contacting the first and second gas stream with an opposite surface of said water-conducting membrane, whereby heat and moisture are transferred from the first stream of outside ambient air to the second stream of enclosure return air.

Count 2. A heat and moisture exchanger core for transferring heat and moisture between a first stream of outside ambient air and a second stream of enclosure return air comprising a water-conducting membrane disposed between the first stream of outside ambient air and the second stream of enclosure return air, said water-conducting membrane comprising a sulfonated statistical copolymer, said statistical copolymer comprising at least one arylvinyl monomer and at least one olefin monomer, wherein aromatic moieties derived from the arylvinyl monomer are at least partially sulfonated; whereby heat and moisture are transferred from the first stream of outside ambient air to the second stream of enclosure return air.

Count 3. An apparatus for conditioning air for an enclosure comprising a heat and moisture exchanger core for transferring heat and moisture between a first stream of outside ambient air and a second stream of enclosure return air, said heat and moisture exchanger core comprising a water-conducting membrane disposed between a first

stream of outside ambient air and a second stream of enclosure return air, said water-conducting membrane comprising a sulfonated statistical copolymer, said statistical copolymer comprising at least one arylvinyl monomer and at least one olefin monomer, wherein aromatic moieties derived from the arylvinyl monomer are at least partially sulfonated;

whereby heat and moisture are transferred from the first stream of outside ambient air to the second stream of enclosure return air.

37 C.F.R. §1.607(a)(3): Applicants submit that independent claim 1 of the '298 patent corresponds exactly to Count 1, and that claims 2 through 15 of the '298 patent, which depend from claim 1, also correspond to Count 1.

Applicants submit that independent claim 16 of the '298 patent corresponds exactly to Count 2, and that claims 17 through 24 of the '298 patent, which depend from claim 16, also correspond to Count 2.

Applicants submit that independent claim 25 of the '298 patent corresponds exactly to Count 3, and that claims 26 through 32 of the '298 patent, which depend from claim 25, also correspond to Count 3.

37 C.F.R. §1.607(a)(4): Applicants submit that pending claims 37, 38, 39 and 40 correspond substantially to Count 1, and explanation therefor is presented below.

Applicants submit that pending claims 41, 42, 43 and 44 correspond substantially to Count 2, and explanation therefor is presented below.

Applicants submit that pending claims 45, 46, 47 and 48 correspond substantially to Count 3, and explanation therefor is presented below.

Applicants have claimed in independent claims 37, 41 and 45, and the claims that depend therefrom, "a sulfonated random hydrocarbon copolymer" rather than "a sulfonated statistical copolymer" because the term "random copolymer" does appear explicitly in Applicants' disclosure, but the term "statistical copolymer" does not appear explicitly in Applicants'

disclosure. However, Applicants submit the following quotations from the '298 patent, to support the position that the term "statistical copolymer" as used in the '298 patent disclosure and its claims, and in proposed Counts 1, 2, and 3 herein, MUST be read to include a random copolymer.

United States Patent No. 6,413,298 at column 5, lines 28-35, teaches:

The polymers may be block, graft or statistical copolymers derived from arylvinyl monomers. Block and graft copolymers contain relatively long segments made up of a homopolymer derived from one of the comonomers. In contrast, the term "statistical" is used herein to refer to polymers that do not contain long segments made up of homopolymer, and to distinguish these from block and graft copolymers. (Emphasis added)

United States Patent No. 6,413,298 defines "statistical copolymer" at column 5, line 46, through column 6, line 13, as including random copolymers as an embodiment:

"Statistical copolymer" is a well defined term of art (see G. Odian, "Principles of Polymerization," 1991), and the use of the term herein is consistent with the commonly understood usage. Statistical copolymers are derived from the simultaneous polymerization of two monomers and have a distribution of the two monomer units along the copolymer chain that follows Bernoullian (zero-order Markov), or first or second order Markov statistics. The polymerization may be initiated by free radical, anionic, cationic or coordinatively unsaturated (e.g., Ziegler-Natta catalysts) species. According to Ring et al., (Pure Appl. Chem., 57, 1427, 1985), statistical copolymers are the result of "elementary processes leading to the formation of a statistical sequence of monomeric units (that) do not necessarily proceed with equal probability. These processes can lead to various types of sequence distributions comprising those in which the arrangement of monomeric units tends toward alternation, tends toward clustering of like units, or exhibits no ordering tendency at all." Bernoullian statistics is essentially the statistics of coin tossing; copolymers formed via Bernoullian processes have the two monomers distributed randomly and are referred to as random polymers. For example, it is possible in a free radical copolymerization for the active end, in the case of one embodiment, a styryl or butadienyl radical, to have essentially no selectivity for styrene vs. butadiene. If so, the statistics will be Bernoullian, and the copolymer obtained will be random. More often than not, there will be a tendency for the propagating chain end to have some selectivity for one monomer

or the other. In rare cases block copolymers can be derived from the simultaneous copolymerization of two monomers when the preference of the propagating chain ends for adding the opposite monomers is very low. The resulting polymer would be categorized as a block copolymer for the purposes of the present invention.  
(Emphasis added)

United States Patent No. 6,413,298 defines "arylviny monomers" at column 6, lines 39-43:

Arylviny monomers are defined herein as monomers that contain a vinyl group substituted with an aryl, haloaryl or alkyl-substituted aryl group. An example of a monomer containing a vinyl group substituted with an aryl is styrene, ...  
(Emphasis added)

United States Patent No. 6,413,298 defines "olefin monomers" at column 7, lines 25-43:

Polymers which are suitable for use in the processes and apparatuses of the present invention comprise residues derived from at least one olefin monomer in addition to those derived from at least one arylvinyl monomer. Preferred olefin monomers include monoolefins, such as  $\alpha$ -olefins and strained ring olefins, and diolefin monomers such as butadiene and isoprene.  $\alpha$ -Olefins include ethylene and C<sub>3-10</sub> olefins having ethylenic unsaturation in the  $\alpha$ - or 1-position, such as ethylene, propylene, butylene, and isobutylene. Suitable  $\alpha$ -olefins include for example,  $\alpha$ -olefins containing from 3 to about 20, preferably from 3 to about 12, more preferably from 3 to about 8 carbon atoms. Particularly suitable are ethylene, propylene, butene-1,4-methyl-1-pentene, 1-hexene or 1-octene or ethylene in combination with one or more of propylene, 1-butene, 4-methyl-1-pentene, 1-hexene or 1-octene. These  $\alpha$ -olefins do not contain an aromatic moiety. Preferred monoolefin monomers are ethylene, propylene, 1-butene, 2-butene, 1-pentene, 4-methyl-1-pentene, 1-hexene, and 1-octene. (Emphasis added)

Applicants respectfully submit that a fair reading of the disclosure of the '298 patent, at least as in the passages given above, teaches that a "statistical copolymer comprising at least one arylvinyl monomer and at least one olefin monomer" includes within its scope a random hydrocarbon copolymer comprising a styrene monomer and an ethylene (or butylene) monomer. Applicants submit that there is explicitly disclosed in their application support for a random hydrocarbon copolymer comprising a styrene monomer and an ethylene (or butylene) monomer, as well as for many other embodiments of membranes comprising sulfonated hydrocarbon

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copolymers and other chemical compositions. Accordingly, Applicants submit that new claim 37 if issued in a patent would anticipate claim 1 of the '298 patent, and that claim 1 of the '298 patent, if valid, would anticipate one or more of new claims 37, 38, 39 and 40. Similarly, Applicants submit that new claim 41 if issued in a patent would anticipate claim 16 of the '298 patent, and that claim 16 of the '298 patent, if valid, would anticipate one or more of new claims 41, 42, 43 and 44. Applicants submit that new claim 45 if issued in a patent would anticipate claim 25 of the '298 patent, and that claim 25 of the '298 patent, if valid, would anticipate one or more of new claims 45, 46, 47 and 48.

37 C.F.R. §1.607(a)(5):

Terms that appear in the '298 patent and the Counts that do not appear in the present application (or the claims thereof) have been explained hereinabove.

37 C.F.R. §1.607(a)(6):

As stated above, less than one year has passed since the date of issue of the '298 patent, and the '776 application from which the '298 patent matured was filed after the earliest effective filing date of the present application.

**Applicants submit that sufficient basis for declaring an Interference has been shown by the above recitation of facts.**

**CLAIMS PATENTABLE TO APPLICANTS**

Applicants have presented independent claims 37, 41 and 45 in the *bona fide* expectation that the limitation of random structure in the at least partially sulfonated hydrocarbon random copolymer is sufficient to provide novelty. Applicants have deliberately omitted from independent claims 37, 41, and 45 such limiting language as "said statistical copolymer

comprising at least one arylvinyl monomer and at least one olefin monomer” that appears in each Count, and in claims 1, 16 and 25 of the ‘298 patent, based on the reasoning that follows.

Applicants note that independent claims 1, 16 and 25 as originally presented in the ‘776 application were allowed in a first Office action without comment. In particular, Applicants note with interest that independent claims 16 and 25 as originally presented in the ‘776 application recited only the limitation of “a sulfonated statistical styrene copolymer” and were deemed allowable. (Emphasis added) Applicants here note for the record that the attorney who prosecuted the ‘776 application VOLUNTARILY ELECTED to amend both claims 16 and 25 to add limitations thereto so as to overcome rejections under 35 U.S.C. §112, second paragraph, of claims 18-23 and 27-32 as filed, rather than amending the rejected claims 18-23 and 27-32 themselves, and thereby created an estoppel for the ‘776 application. Instead, the practitioner could have amended any of the rejected claims to recite language such as “The invention of claim 16, further comprising a . . . ” so as to overcome a lack of antecedent basis. Alternatively, the practitioner could have introduced new independent claims 33 and 34, corresponding to claims 16 and 25 with the limitations that were added thereto, and simultaneously could have amended dependent claims 18-23 and 27-32 to depend respectively from new claims 33 and 34, while leaving allowed claims 16 and 25 undisturbed. However, by electing not to preserve claims 16 and 25 undisturbed, the practitioner irrevocably gave up claim scope, and put the public on notice of such disclaimer of claim scope.

Applicants here believe that new claims 37, 41 and 45 should be allowable to the present Applicants, in that they include as a limitation “an at least partially sulfonated random hydrocarbon copolymer.” For the record, Applicants have not participated in or acquiesced in the voluntary concession of claim scope that the practitioner made in the ‘776 application, nor do they now so acquiesce or concede patent claim scope.

Applicants have presented in dependent claims 38, 42 and 46 the limitation that the at least partially sulfonated random copolymer comprises at least one arylvinyl monomer, and in dependent claims 40, 44 and 48 the limitation that the at least partially sulfonated random copolymer comprises at least one olefin monomer. Applicants have additionally presented in

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dependent claims 39, 43 and 47 the additional limitation that the at least partially sulfonated random copolymer comprises an arylvinyl monomer that is at least partially sulfonated.

## CONCLUSION

Based upon the above amendments, and remarks, Applicants believe the pending claims of the above-captioned application are in allowable form and are patentable to Applicants over the prior art of record. Applicants respectfully request that an Interference between the present application and the '298 patent be declared promptly.

Please direct any questions or comments to Joseph B. Milstein at (315) 425-9000.

Respectfully submitted,

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